ORIGINAL ARTICLE

Glossopharyngeal Neuralgia and its Surgical Management

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ABSTRACT

Objective: The purpose of the study was to evaluate the surgical management of Glossopharyngeal Neuralgia.

Materials and Methods: It a retrospective study of seven (7) cases of Glossopharyngeal Neuralgia who were surgically managed at Department of Neurosurgery Quaid-e-Azam Medical College / Bahawal Victoria Hospital Bahawalpur. It is retrospective study with study period of eight (8) years from January 2003 to December 2010 with follow up period of two years.

Results: Four (4) were female and three (3) were male patients. Age range was 40 to 60 years with average age of 45 years. In all the patients except one, IX nerve sectioning alongwith sectioning of upper rootlets of X nerve was performed in the posterior fossa through retrosigmoid approach. In one patient, Microvascular Decompression was performed for the pain syndrome. There was recurrence of same pain in that patient after six months of surgery. Second surgery was done in that patient to section the IX nerve only in the posterior fossa. All cases were that of "IDIOPATHIC GLOSSOPHRYNGEAL NEURALGIA". In all the patients there was satisfactory relief of pain after surgery with no significant complications related to the procedure.

Conclusion: So the sectioning of The Glossophryngeal Nerve is a useful procedure for the relief of this pain syndrome. Another good alternative is Microvascular Decompression of this nerve at root entry zone in the posterior fossa.

Key Words: *Glossopharyngeal Neuralgia, root entry zone, posterior fossa, pain syndrome.*

Abbreviations: *GPN = Glossopharyngeal Neuralgia, MVD = Microvascular Decompression.*

INTRUDUCTION

Glossopharyngeal neuralgia is an episodic, paroxysmmal, severe lancinating pain in the distribution of Glossopharyngeal Nerve.

Glossopharyngeal neuralgia is not just a painful condition. At times, it may be life – threatening as a result of associated cardiovascular consequences. Even in the absence of life-threatening consequences, it can be a severe debilitating disease with depression, suicidal tendencies, fear of swallowing, loss of weight and under – nutrition.

Amongst the lower 6 cranial nerves, the glossopharyngeal nerve is the smallest in terms of nerve diameter, importance and clinical significance. When compared with the facial, vestibulocochlear, vagus, accessory and hypoglossal nerves, the glossopharyngeal nerve appears to dwarf in comparison.

The glossopharyngeal nerve has both sensory and motor components. It receives somatic sensory fibers from the oro-pharynx, posterior third of the tongue, Eustachian tube, middle ear and mastoid. The sensory supply to the middle ear and mastoid passes along the tympanic branch or Jacobson's nerve. The glossopharyngeal nerve also receives special sensory fibers for taste in the posterior third of the tongue as well as chemoreceptor and baro-receptor afferent inputs from the carotid body and carotid sinuses respectively.

The motor component supplies the striated muscle stylopharyngeus and secretomotor parasympathetic fibers to the parotid gland. The tympanic branch or Jacobson's nerve is a very important branch of the glossopharyngeal nerve. It carries somatic sensory fibers which receive pain and touch from the middle ear and mastoid, and secretomotor parasympathetic fibers to

the parotid gland. It does not supply the external ear canal or pinna. The Jacobson's nerve emanates from the petrous ganglion of the glossopharyngeal nerve at or above the level of the jugular foramen. It runs to the tympanic plexus lying on the promontory on the medial wall of the middle ear. Glossopharyngeal neuralgia was first described by Weisenburg[4] in 1910 as "tic doloureux". His patient had presented with the classical symptoms of lancinating pain in the ear and neck. It was only discovered 6 years later when the patient died and an autopsy was performed, that the patient had a cerebellopontine angle tumour. The tumour was noted to be compressing the trigeminal nerve and stretching the glossopharyngeal nerve at autopsy.

Ten years later in 1920, Sicard and Robineau[5] described three patients who had "algie velo-pharyngee essentielle" i.e. pain in the distribution of the glossopharyngeal nerve without any known cause. Their patients developed suicidal tendencies after treatment with sedatives or physical agents did not work. However, sectioning of the glossopharyngeal nerves through the cervical approach was successful in relieving the pain in all three of their patients.

A year later, Harris[6] coined the term "glossopharyngeal neuralgia", describing it as a painful syndrome characterised by paroxysms of unilateral and severe lancinating pain occurring in the distribution of the nerve, and which may be elicited by stimulation of trigger points in regions supplied by the nerve. The pain may be spontaneous or precipitated by a variety of actions that stimulate the region supplied by the glossopharyngeal nerve namely yawning, coughing, swallowing and talking.

Glossopharyngeal neuralgia has been divided into two clinical types[8] based on the distribution of pain:

1. **Tympanic type** which affects mainly the ear.
2. The **Oropharyngeal type** which affects mainly the oropharyngeal area.

Lymphatic Type

The presence of pain in the ear is attributed to the somatic sensory supply of the tympanic membrane, middle ear and mastoid by the Jacobson's nerve, which branches off the glossopharyngeal nerve at the petrous ganglion.

Surgical Procedure

1. MVD: Microvascular Decompression.
2. Sectioning of Routes.

The importance of differentiating between the two clinical types lie in making the choice between a low or high approach to sectioning the glossopharyngeal nerve. A high approach avulses the nerve at or proximal to the petrous ganglion, or even at the nerve root entry zone at the brainstem. This is used for lymphatic type. A low approach avulses the nerve distal to the petrous ganglion, thus leaving the Jacobson's nerve intact. This is used for oropharyngeal type.

Etiology

Idiopathic Glossopharyngeal Neuralgia.

Glossopharyngeal neuralgia usually occurs without any obvious cause. When good results were reported for microvascular decompression of the glossopharyngeal nerve[12,13] in 1977, it became apparent that most of these cases of **"idiopathic"** glossopharyngeal neuralgia could be caused by **vascular compression** of the glossopharyngeal nerve at the nerve root entry zone, causing a hyperactive rhizopathy. The implicating vessel is usually the posterior inferior cerebellar artery (PICA)[14] which frequently also compresses on the rootlets of the vagus nerve.

Secondary Glossopharyngeal Neuralgia

Before embarking on an intracranial explorative procedure, it is important to exclude **secondary** causes of glossopharyngeal neuralgia. Any sort of compression or irritation to the glossopharyngeal nerve can result in neural hyper-excitability and neuralgia. The most common secondary cause of neuralgia is the **Eagle's syndrome**[17-20] or **styalgia**. It is a glossopharyngeal nerve hyper-excitability syndrome caused by compression of the nerve against an elongated or fractured[21] **styloid process** or a **calcified** stylo-hyoid ligament.[22]

Other causes of **secondary glossopharyngeal** neuralgia include: cerebellopontine angle tumours,[4,23] parapharyngeal space lesions,[24] metastasis to petrous temporal bone from breast carcinoma,[25] post-tonsillectomy,[26] local infection,[27,28] carcinoma of the parapharyngeal space[28,29] carcinoma of the pharynx,[6,30] nasopharyngeal carcinoma,[31] posterior fossa arterio-venous malformation.[32]

MATERIAS AND METHODS

It is a retrospective study of seven (7) cases of Glossopharyngeal Neuralgia which were surgically treated at the Department of Neurosurgery Quaid-e-Azam Medical College / Bahawal Victoria Hospital Bahawalpur. Study period is eight (8) years from January 2003 to December 2010, with follow up period of two years.

Table 1: *Sex Incidence.*

Sex	Number	Percentage
Male	3	42.85
Female	4	57.15
Total	7	100

Table 2: *Age Incidence.*

Age	Minimum	Maximum	Mean
Age in Years	40	60	45

Table 3: *Surgical Groups.*

Group	Number	Percentage	Surgical Procedure
Group A	6	86%	Surgical Rhizotomy
Group B	1	14%	MVD
Total	7	100%	

Group A

In six (6) patients, Glossopharyngeal nerve section alongwith sectioning of upper fibers of Vagus nerve was performed through posterior fossa approach by doing retrosigmoid craniectomy, opening of dura and identifying the IX and X cranial nerves.

Group B

In one patient, Microvascular Decompression was performed for the Glossopharyngeal nerve through the same posterior fossa approach.

RESULTS

Sex Incidence

Four (4) were female and three (3) were male patients.

Age Incidence

Age range was 40 – 60 years with average age of 45 years.

Total patients were seven (7) in number. Group A: In six (6) patients, in which IX nerve sectioning alongwith cutting of upper rootlets of X nerve was performed, all patients except one were pain free during the follow up period.

One patient out of six (6), had recurrence of same pain but with less intensity, one year after surgery. But his pain remained under good control with simple medications for pain and second surgery was not required for him.

Group B: In one patient out of seven (7), Microvascular Decompression was performed for IX nerve to relieve the pain. Patient did well for 6 months but pain recurred with same intensity as before, six months after surgery. Second time surgery was planned in that patient and now only the IX nerve was cut in the posterior fossa without cutting the X nerve fibres. Patient again has satisfactory relief of pain after surgery and remained pain free during follow up period.

Complications

There were no other significant complication in these patients except recurrence of pain in two patients as mentioned above, who were treated accordingly with very good outcome.

DISCUSSION

There is no specific medical treatment for glossopharyngeal neuralgia. The treatment of choice and the one which produces excellent results is the intracranial sectioning of the involved 9th cranial nerve proximal to its enter into the jugular foramen. The operation can be performed with a little risk through unilateral sub-occipital craniotomy / craniectomy.[1]

Microvascular decompression is currently the most effective operation to treat Glossopharyngeal neuralgia. If exploratory surgery does not identify an offending vessel, sectioning of cranial nerve IX and

Table 4: *Outcome.*

Groups	Surgical Procedure	Number	Percentage	Outcome	Complication
Group A	Surgical Rhizotomy of IX and Xth Roots	6	86	Excellent	Nil
Group B	MVD	1	14	Initially good for 6 months	Recovered

the upper rootlets of the cranial nerve X is an option.[2] In our case series we did sectioning of IX and X nerves in almost all the cases with good results. In one of our cases, Microvascular Decompression was performed but the patient came with recurrence of same severe pain, 6 months after surgery and we have to do sectioning of IX cranial nerve with very good outcome.

Extra-cranial nerve ablation was one of the first procedures attempted for treatment of GPN.[43,57] This approach was abandoned due to its high morbidity and pain recurrence due to a lack of supraganglionic ablation. Dandy[10] performed some of the first intracranial rhizotomies of the glossopharyngeal nerve with good results. Even though short-term results were good after these procedures, long-term pain recurrence was frequent. Rhizotomy of the vagus sensory rootlets improved long-term outcomes.[5,41] Intracranial rhizotomies of cranial nerves IX and X were the preferred surgical procedure until the 1970s. Based on his intra-operative observations, Dandy[9] proposed vascular compression of the root entry / exit zones of the cranial nerves as a possible cause for cranial nerve hyperactivity syndromes. Jannetta[22–25] further investigated this mechanism and published the first series of patients with GPN treated with MVD.[39] Since that time, this operation has gained greater acceptance than the traditional rhizotomy procedures and many series have been published regarding its efficacy.[15–17,26,30,34,39,45–47,50,56,60,67]

Sectioning the upper rootlets of cranial nerve X to improve pain control is based on clinical observations rather than careful, reliable anatomical / functional studies.[52] The vagus nerve does not have a craniocaudal sensorimotor organization, and in fact, the sensory fibers might be located dorsally and the motor fibers ventrally.[62] However, accumulated experience from older series (not considering MVD as an option) has demonstrated a high pain recurrence rate when cranial nerve IX and X rhizotomies are not performed simultaneously. Physiologically, sectioning the upper rootlets of the vagus nerve increases the pharyngeal sensory loss already caused by cranial nerve IX rhizotomy, potentially resulting in paralysis of the ipsilateral vocal cord and motor arc of the gag reflex. Most authors describe rhizotomy of the upper rootlets of cranial nerve X as benign, leading only to an irritative cough, foreign body sensation in the throat, and transient hoarseness or dysphagia.[8,31,54] However, it appears that rhizotomy leads to slightly better pain control at the expense of higher postoperative permanent cranial nerve dysfunction.

CONCLUSION

Glossophryngeal Neuralgia is a very severe pain which disturbes the daily activities of the patient. Medical treatment does not provide any satisfactory relief of the pain usually and if it fails surgical management is a best choice. It may be in the form of sectioning of IX nerve with cutting of upper fibers of X nerve or Microvascular Decompression may also be performed to treat the condition. In our experience however, sectioning of IX nerve with cutting of upper rootlets of X nerve proved to be a good procedure.

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